Agilent

U2761A USB Modular Function/Arbitrary Waveform Generator

Data Sheet

Agilent Technologies

Features

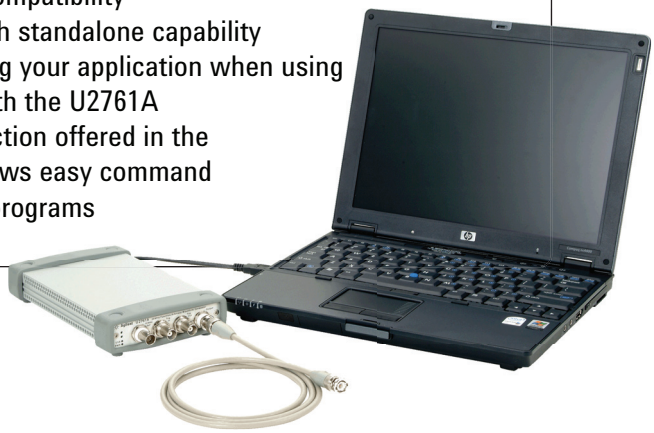
- **20 MHz sine and square waveforms**
- **Hi-Speed 2.0, USBTMC 488.2 standards**
- **Sine, Square, Ramp, Triangle, Pulse and DC waveforms**
- **14-bit, 50 MSa/s, 64 k-points Arbitrary waveforms**
- **AM, FM, PM, ASK, FSK and PSK modulation types**
- **40 mVpp to 5 Vpp amplitude range (into 50 ohm load)**
- **Pulse generation**
- **Easy-to-use bundled software**
- **Arbitrary waveform editor**
- **Command logger function**

Overview

The Agilent U2761A is a 20 MHz USB modular function generator with Arbitrary waveform and pulse generation capability. It can operate as a standalone or modular unit when used with the U2781A USB modular instrument chassis.

Various features of the U2761A

- Latest DDS technology adoption for more stable and accurate output signal
- Easy-to-use arbitrary waveform editor for easy customization of waveform generation
- Built-in modulation capability eliminates the need for a separate modulation source
- Pulse generation up to 5 MHz with variable period, pulse width and amplitude that is ideal for wide variety of applications
- Wide range of ADE compatibility
- Low start-up cost with standalone capability
- Flexibility in expanding your application when using it as modular unit with the U2761A
- Command logger function offered in the bundled software allows easy command conversion into VEE programs



Direct Digital Waveform

The U2761A adopts the latest direct digital synthesis (DDS) technology that digitally creates arbitrary waveforms and frequencies from a single and fixed frequency source. DDS offers the precision of digitally controlled logic—reducing the complexity of the generator while increasing the stability. Thus, allowing you to have a stable, accurate output signal for clean, low distortion sine waves with fast rise and fall time up to 20 MHz and linear ramp waves up to 200 kHz.

Arbitrary Waveform Editor

With every purchase of the U2761A, it is bundled with an easy-to-use application software, the Agilent Measurement Manager. This application allows customization of waveforms generation.

Pulse Generation

The U2761A can generate variable edge-time pulses up to 5 MHz. With variable period, pulse width, and amplitude, the U2761A is ideally suited to a wide variety of applications requiring a flexible pulse signal.

Internal Modulation

Internal AM, FM, PM, ASK, FSK, and PSK modulation make it easy to modulate waveforms without the need for a separate modulation source. Linear and logarithmic sweeps are also built in, with sweep rates selectable from 1 ms to 500 s.

Ease-of-Use
The U2761A is equipped with Hi-Speed USB 2.0 interface for easy setup, plug-and-play, and hot-swappable connectivity. Together with its user friendly user-interface, its ease-of-use makes it ideal for academic and testing environment.

Flexible Standalone or Modular Capability
The U2761A is uniquely designed for the flexibility of functioning as a standalone or modular unit. The standalone PC-based unit allows you to have a low start-up cost.

ADE Compatibility
The U2761A is compatible with a wide range of Application Development Environment. This minimizes all the time taken by developers as they can program directly using the SCPI commands.

Listed below are the popular development environments and tools that the U2761A is compatible with:
- Agilent VEE and Agilent T&M Toolkit
- Microsoft® Visual Studio .NET, C/C++ and Visual Basic 6
- LabView®
- MATLAB®

Easy-to-use AMM the offered command logger function
Better yet, Agilent Measurement Manager application software provides a quick and easy means to configure and control the device. This enhanced the productivity as it allows users to start performing measurement promptly without the need to write any programming codes.

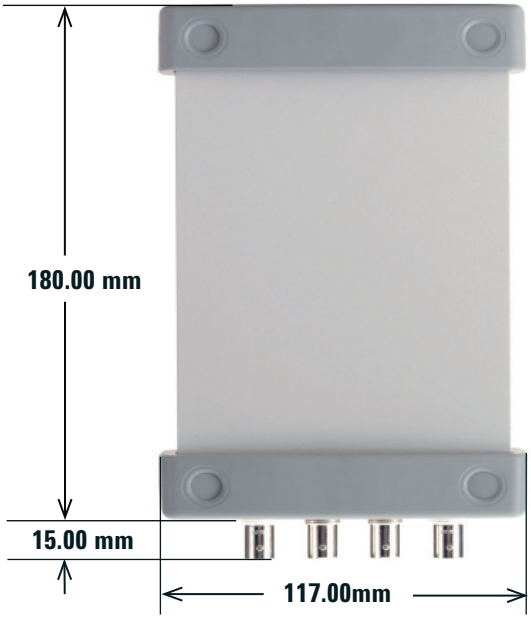
The Agilent Measurement Manager also comes with a command logger function that allows capturing of commands that can be easily converted to VEE programs for VEE users.

Product Outlook and Dimensions

Front View

Rear View

Top View



Standard Shipped Item

- 12 V, 2 A AC/DC Adaptor
- Power Cord
- USB Standard-A to Mini-B Interface Cable
- L-Mount Kit (used with modular instrument chassis)
- Agilent Automation-Ready CD (contains the Agilent IO Libraries Suite)
- Agilent USB Modular Products Quick Start Guide
- Agilent USB Modular Products Reference CD-ROM
- Agilent Measurement Manager Quick Reference Card
- Certificate of Calibration

Optional Accessories

- 1.5 m BNC Coax Cable
- USB Secure Cable

System Requirements

PROCESSOR 1.6 GHz Pentium® IV or higher
OPERATING SYSTEM One of the following Microsoft® Windows® versions: • Windows XP Professional or Home Edition (Service Pack 1 or later) • Windows 2000 Professional (Service Pack 4 or later)
BROWSER Microsoft® Internet Explorer 5.01 or higher
AVAILABLE RAM 512 MB or higher recommended
HARD DISK SPACE 1 GB
VIDEO Super VGA (800 x 600) 256 colors or higher
PREREQUISITES • Agilent IO Libraries 14.2[1] or higher • Agilent T&M Toolkit 2.1 Runtime version 2[2] • Microsoft .NET Framework version 1.1 and 2.0[2]

1 Available in Agilent Automation-Ready CD.

2 Bundled with Agilent Measurement Manager application software installer.

Product Characteristics and General Specification

REMOTE INTERFACE • Hi-Speed USB 2.0 • USBTMC 488.2 Class Device
POWER CONSUMPTION • +12 VDC, 2 A • Isolated ELV power source
OPERATING ENVIRONMENT • Operating Temperature from 0 °C to 50 °C • Operating Humidity at 20% to 85% RH (non-condensing) • Altitude up to 2,000 meters • Pollution Degree: 2
STORAGE COMPLIANCE • Storage Temperature from –20 °C to 70 °C • Storage Humidity at 5% to 90% RH (non-condensing)
SAFETY COMPLIANCE Certified with: • IEC 61010-1:2001/ EN61010-1:2001 (2nd Edition) • Canada : CAN/CSA-C22.2 No. 61010-1-04 • USA: ANSI/UL 61010-1:2004
EMC COMPLIANCE • IEC 61326-2002/ EN 61326:1997+A1:1998+A2:2001+A3:2003 • Canada : ICES-001:2004 • Australia/New Zealand: AS/NZS CISPR11:2004
SHOCK & VIBRATION Tested to IEC/EN 60068-2
IO CONNECTOR BNC Connector
DIMENSION (WxDxH) • 117.00 mm x 180.00 mm x 41.00 mm (with bumpers) • 105.00 mm x 175.00 mm x 25.00 mm (without bumpers)
WEIGHT • 528 g (with bumpers) • 476 g (without bumpers)
WARRANTY One year

Product Specifications and Measurement Characteristics

WAVEFORMS	
Standard	Sine, Square, Ramp, Triangle, Pulse, DC
Built-in arbitrary	Exponential Rise, Exponential Fall, Negative Ramp

WAVEFORM CHARACTERISTICS			
SINE			
Frequency range	1 µHz to 20 MHz (1 µHz resolution)		
Amplitude flatness [1] (relative to 1 kHz)	<100 kHz	0.2 dB	
	100 kHz to 10 MHz	0.3 dB	
	10 MHz to 20 MHz	0.5 dB	
Harmonic distortion [2]	Frequency range	<1 Vpp	≥1 Vpp
	DC to 20 kHz	–70 dBc	–60 dBc
	20 kHz to 100 kHz	–65 dBc	–60 dBc
	100 kHz to 1 MHz	–50 dBc	–45 dBc
	1 MHz to 20 MHz	–40 dBc	–35 dBc
Total harmonic distortion[2]	DC to 20 kHz	0.10%	
Spurious (Non-harmonic) output [3]	DC to 1 MHz	–65 dBc	
	1 MHz to 20 MHz	–65 dBc + 6 dB/octave	
Phase noise (10 kHz offset)	–115 dBc/Hz (Typical)		
SQUARE			
Frequency range	1 µHz to 20 MHz (1 µHz resolution)		
Rise/Fall time	<18 ns, 10 to 90% terminated load (50 Ω)		
Overshoot	<2%		
Variable duty cycle	20% to 80% (to 10 MHz) 40% to 60% (to 20 MHz)		
Asymmetry (@ 50% duty)	1% of period + 5 ns		
Jitter (RMS)	>50 kHz = 1 ns + 100 ppm of period ≤50 kHz = 10 ns + 100 ppm of period		
RAMP, TRIANGLE			
Frequency range	1 µHz to 200 kHz (1 µHz resolution)		
Linearity	<0.2% of peak output		
Programmable Symmetry	0% to 100%		
PULSE			
Frequency range	500 µHz to 5 MHz (1 µHz resolution)		
Pulse width (period ≤ 10 s)	40 ns minimum, 10 ns resolution		
Overshoot	<3%		
Jitter (RMS)	300 ps + 0.1 ppm of period		
ARBITRARY			
Frequency range	1 µHz to 200 kHz (1 µHz resolution)		
Waveform memory depth	64 kSa		
Amplitude resolution	14 bits/sample (including sign)		
Sampling rate	50 MSa/s		
Minimum rise/fall time	35 ns (Typical)		
Linearity	<0.2 % of peak output		
Settling Time	<250 ns to 0.5% of final value		
Jitter (RMS)	10 ns + 30 ppm		

COMMON CHARACTERISTICS	
AMPLITUDE	
Range	40 mVpp to 5 Vpp (Into 50 Ω load) 80 mVpp to 10 Vpp (Into open circuit)
Accuracy [1] (across 50 Ω load at 1 kHz)	± 1% of setting ± 5 mV
Units	Vpp, Vrms. dBm
Resolution	4 digits
DC OFFSET	
Range (peak AC – DC)	± 2.5 V (Into 50 Ω load)
	± 5 V (Into open circuit)
Accuracy [1] (across 50 Ω load)	±2% of offset setting ±1% of amplitude ±5 mV (±10 mV @Hi-Z)
Amplitude Limit	Amplitude + Offset limit to witthin ±2.5 V range across 50 Ω load or across open circuit
MAIN OUTPUT	
Impedance	50 Ω load (Typical)
Isolation	At least 42 Vpk to earth
Protection	Short-circuit protected, overload automatically disables main output
INTERNAL FREQUENCY REFERENCE	
Accuracy [4]	± 8ppm in 1 year
EXTERNAL FREQUENCY REFERENCE	
Input Lock range Amplitude level Impedance Lock time	 10 MHz ±170 Hz 500 mVpp to 5 Vpp 50 Ω AC coupled <2 s
Output Frequency Amplitude Level Impedance	 10 MHz 632 mVpp (Typical) Return loss 10 dB (Typical) at 10 MHz
Phase Offset Range Resolution Accuracy	 +360 ° to –360 ° 0.01 ° 20 ns

TRIGGER CHARACTERISTICS	
TRIGGER INPUT	
Input level	TTL compatible
Slope	Rising and Falling, Selectable
Pulse width	>100 ns
Input impedence	>10 kΩ, DC coupled
Latency	<500 ns
Jitter (RMS)	6 ns (3.5 ns for Pulse)
TRIGGER OUTPUT	
Input Level	TTL compatible into ≥1 kΩ
Pulse width	>400 ns
Output impedance	50 Ω (Typical)
Fanout	4 TTL
Rise time	≤20 ns

MODULATION	
Modulation scheme	Internal, AM, FM, PM, FSK, PSK, ASK
AM	
Carrier waveforms	Sine, Square, Ramp, Arbitrary
Source	Internal
Internal modulation	Sine, Square, Ramp, Arbitrary (2 mHz to 20 kHz)
Depth	0.0% to 100.0%
FM	
Carrier waveforms	Sine, Square, Ramp, Arbitrary
Source	Internal
Internal modulation	Sine, Square, Ramp, Arbitrary (2 mHz to 20 kHz)
Deviation	1 Hz to 500 kHz
PM	
Carrier waveforms	Sine, Square, Ramp, Arb
Source	Internal
Internal modulation	Sine, Square, Ramp, Arbitrary (2 mHz to 20 kHz)
Deviation	0.0 ° to 360.0 °
FSK	
Carrier waveforms	Sine, Square, Ramp, Arbitrary
Source	Internal
Internal modulation	50% duty cycle square (2 mHz to 100 kHz)
PSK	
Carrier waveforms	Sine, Square, Ramp, Arb
Source	Internal
Internal modulation	50% duty cycle square (2 mHz to 100 kHz)
Deviation	0.0 ° to 360.0 °
ASK	
Carrier waveforms	Sine, Square, Ramp, Arb
Source	Internal
Internal modulation	50% duty cycle square (2 mHz to 100 kHz)

SWEEP CHARACTERISTICS	
Waveforms	Sine, Square, Ramp, Arbitrary
Type	Linear or Logarithmic
Start frequency	1 µHz
Stop frequency	20 MHz
Direction	Up or Down
Sweep time	1 ms to 5000 s
Trigger	Single, External, or Internal

1 Add 1/10th of output amplitude and offset specification per °C for operation outside the range of 18 °C to 28 °C.
2 DC offset set to 0 V.
3 Spurious output at low amplitude –70 dBm, typical.
4 Add 1 ppm/°C (average) for operation outside the range of 18 °C to 28 °C.

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